

REMOTE SENSING OF PERCHLORATE EFFECTS ON SALT CEDAR- PRELIMINARY RESULTS FROM THE LAS VEGAS WASH

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ABSTRACT

Sodium perchlorate and ammonium perchlorate, major components of solid rocket fuel, have been manufactured in the Las Vegas Valley immediately up gradient from the Las Vegas Wash, since 1945 and 1956, respectively. Measurements of emerging ground water quality in the vicinity of the Wash have perchlorate concentrations up to 100,000 ppb, and surface water in the Wash has concentrations of approximately 400 ppb. The potential discharge of perchlorate into Lake Mead and the lower Colorado River system is an environmental concern. This study examines the feasibility of mapping perchlorate effects in Salt Cedar (*Tamarix ramosissima*), an invasive tree species in riparian zones throughout the southwest, as an indicator of perchlorate contamination. Our working hypothesis is that Salt Cedar accumulates perchlorate from contaminated soils and shallow groundwater resulting in measurable physiological changes. Preliminary results using NASA MODIS/ASTER Simulator (MASTER) low altitude aircraft data acquired in October of 1999, low altitude AVIRIS aircraft data acquired in July of 2000, chemical analysis of soil, water, and foliar samples, and field and laboratory spectrometry are presented. These preliminary results are all consistent and indicate that Salt Cedar leaves and branches contain perchlorate in the vicinity of shallow contaminated groundwater and soils, and that the spectral characteristics of severely affected trees differ from unaffected trees. This difference is particularly evident in a composite of Principal Components Transformation Bands 4, 5, and 6 from the 50-band MASTER overflight data which shows a unique spectral response in the vicinity of the documented perchlorate plume.